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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,775	09/18/2003	Julie C. Biggs	END920030018US1 (IEN-10-5)	9436
26681	7590	11/02/2004	EXAMINER PHAM, THANHHA S	
DRIGGS, LUCAS BRUBAKER & HOGG CO. L.P.A. DEPT. IEN 8522 EAST AVENUE MENTOR, OH 44060			ART UNIT 2813	PAPER NUMBER

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/666,775

Applicant(s)

BIGGS ET AL.

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/18/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-10, drawn to a method of forming a wire bond in an IC chip, classified in class 438, subclass 617.

II. Claims 11-17, drawn to an IC chip, classified in class 257, subclass 778.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product invention II can be made by another and materially different process, for example, a conventional process without applying a photoresist material over the seed layer, exposing and developing the photoresist layer to reveal the surface of the seed layer surrounding the opening in the dielectric layer, removing the exposed upper seed layer, removing the photoresist material to reveal the remaining seed layer thereunder (see claims 1 and 11 & 14 for details).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

2. During a telephone conversation with Bill Hogg on 10/12/04, a provisional election was made without traverse to prosecute the invention II, claims 11-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-10 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

4. The listing of references in the specification (page 5) is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate

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paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Oath/Declaration

5. Oath/Declaration filed on 09/18/03 has been considered.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the wire 54 bonded to the Au of the Ni/Au layer 48/50 as described in the specification (page 6). Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the

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drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

7. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

8. **Claims 11-17 are objected to because of informalities. Appropriate corrections are required to clarify the scope of the claims.**

➤ With respect to claim 11,

lines 3, 5, and 6, "said bond pad" should be changed to "said conductive bond pad"

➤ With respect to claim 12,

line 1, "The invention as defined in" should be changed to "The I/C chip as defined in" to clarify the scope of the claims.

line 2, "said bond pad" should be changed to "said conductive bond pad"

➤ With respect to claims 13-14,

line 1, "The invention as defined in" should be changed to "The I/C chip as defined in" to clarify the scope of the claims.

➤ With respect to claim 15,

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line 1, "The invention as defined in" should be changed to "The I/C chip as defined in" to clarify the scope of the claims.

line 2, "said bond pad" should be changed to "said conductive bond pad"

➤ With respect to claim 16,

line 1, "The invention as defined in" should be changed to "The I/C chip as defined in" to clarify the scope of the claims.

➤ With respect to claim 17,

line 1, "The invention as defined in" should be changed to "The I/C chip as defined in" to clarify the scope of the claims.

line 1, "the conductive pad" should be changed to "the conductive bond pad"

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCormick [US 6,706,622] in view of Chen et al. [US 6,649,507].

➤ With respect to claims 11 and 17, McCormick (figure 6 and cols. 2-4) discloses an I/C chip comprising:

at least one layer of dielectric material (12, col. 2 lines 56-60) overlying a substrate (10);

a surface defining an opening (14) in said layer of dielectric material (12) exposing said substrate (10); and

at least one layer of conductive material (26, 30) overlying said substrate (10) and in contact therewith, and also overlying and in contact with the entire surface of the opening (14) (see figure 6 and cols. 3 lines 29-45).

McCormick does not show the dielectric material (12) overlying and exposing at least one conductive bond pad **[claim 11]** of aluminum **[claim 17]**. McCormick only mentions that under bump metallization is provided on integrated circuit bond pad (see col. 1, lines 10-18) wherein the at least one layer of conductive material (26,30) is a portion of the under bump metallization (see figure 6 and col. 2 lines 54-67).

However, Chen et al. discloses the aluminum bond pad (12) on the substrate (10) wherein the dielectric material (14) overlying and exposing the aluminum bond pad (12). Chen et al. also teaches the under bump metallization (16') overlying and being in

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contact with the aluminum bond pad (12) [see figure 6 and col. 2 lines 63-67, col. 3 lines 1-15].

Therefore, at the time of invention, it would have been obvious for those skilled in the art to have the at least one conductive bond pad of aluminum as being claimed, per taught by Chen et al., in the I/C chip of McCormick to provide and control appropriate electrical connections in integrated circuit wherein the dielectric layer overlying and exposing the bond pad passivates/protects a portion of the bond pad and substrate from contamination. In the I/C chip of McCormick in view of Chen et al., said at least layer of conductive material would be overlying and in contact with the bond pad, as being claimed, to provide stable electrical paths for I/C chip's operation.

- With respect to claims 12 and 13, McCormick (col. 3 lines 32-40) discloses that there are two layers of conductive material (26, 30) wherein said two layers are Ni and Au.
- With respect to claim 14, McCormick (col. 3 lines 4-10) discloses that a seed layer (18) underlies said at least one conductive layer (26, 30).
- With respect to claims 15 and 16, McCormick (col. 3 lines 1-4) discloses that an intermediate conductive layer (16) underlies between said seed layer (18), wherein the intermediate conductive layer (16) is TaN/Ta.

Conclusion

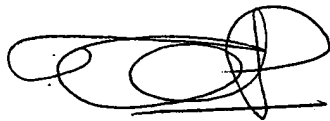
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-

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1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of several loops and a final horizontal stroke.

Thanhha Pham
Patent Examiner
Patent Examining Group 2800